Analytical Laboratory

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number: **J11100223**

Customer Name(s): Bill Kennedy, Melonie Martin, Wayne Chapman, Tom Johnson

Customer Address: 3195 Pine Hall Rd
Mailcode: Belews Steam Station
Belews Creek, NC 28012

Lab Contact: Jason C Perkins Phone: 980-875-5348

Report Authorized By: (Signature) Digitally signed by jay perkins DN: cn=jay perkins, o=Analytical Lab, ou, email=jay.perkins@duke-energy.com, c=US Date: 2011.11.01 11:24:04 -04'00' **Date:** 11/1/2011

Program Comments:

The R1 qualifier on the Ca trip blank is in error. Please disregard.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2011022388	BELEWS	10-Oct-11 10:00 AM	dean m	FGD Purge Eff
2011022389	BELEWS	10-Oct-11 10:00 AM	dean m	BIOREACTOR 1 INF.
2011022390	BELEWS	10-Oct-11 10:00 AM	dean m	BIOREACTOR 1 INF. BLANK
2011022391	BELEWS	10-Oct-11 10:00 AM	dean m	BIOREACTOR 2 EFF.
2011022392	BELEWS	10-Oct-11 10:00 AM	dean m	BIOREACTOR 2 EFF. BLANK
2011022393	BELEWS	10-Oct-11 10:00 AM	dean m	FILTER BLANK
2011022394	BELEWS	10-Oct-11 10:00 AM	dean m	Trip Blank

7 Total Samples

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures).	☑ Yes	☐ No
All Results are less than the laboratory reporting limits.	☐ Yes	☑ No
All laboratory QA/QC requirements are acceptable.	☑ Yes	☐ No
The Vendor Laboratories have been qualified by the Analytical Laboratory	Yes	

Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☑ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: DataBase Administrator Date: 10/27/2011

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J11100223

Site: FGD Purge Eff
Collection Date: 10-Oct-11 10:00 AM

Sample #: **2011022388**
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5)							
Vendor Parameter	**Complete**				V_PRISM		
Carbonate, Bicarbonate, and Hydroxide Alkalinity							
Carbonate (CO3)	**Complete**				V_PRISM		
Bicarbonate (HCO3)	**Complete**				V_PRISM		
Hydroxide (OH)	**Complete**				V_PRISM		
NITRITE + NITRATE (COLORIMETRIC)							
Nitrite + Nitrate (Colorimetric)	**15**	mg-N/L		0.25	EPA 353.2	18-Oct-11 13:01	BGN9034
INORGANIC IONS BY IC							
Bromide	**95**	mg/L		5	EPA 300.0	20-Oct-11 06:14	JAHERMA
Chloride	**6900**	mg/L		100	EPA 300.0	20-Oct-11 06:14	JAHERMA
Sulfate	**1200**	mg/L		100	EPA 300.0	20-Oct-11 06:14	JAHERMA
MERCURY (COLD VAPOR) IN WATER							
Mercury (Hg)	**234**	ug/L		5	EPA 245.1	21-Oct-11 09:51	AGIBBS
Mercury Dissolved (cold vapor) in Water (Filtered)							
Mercury (Hg)	**5.30**	ug/L		2.5	EPA 245.1	21-Oct-11 10:53	AGIBBS
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**160**	mg/L		0.5	EPA 200.7	24-Oct-11 13:34	DJSULL1
Calcium (Ca)	**3940**	mg/L		0.1	EPA 200.7	24-Oct-11 13:34	DJSULL1
Lithium (Li)	**0.130**	mg/L		0.05	EPA 200.7	24-Oct-11 13:34	DJSULL1
Magnesium (Mg)	**563**	mg/L		0.05	EPA 200.7	24-Oct-11 13:34	DJSULL1
Potassium (K)	**45.9**	mg/L		1	EPA 200.7	24-Oct-11 13:34	DJSULL1
Sodium (Na)	**41.2**	mg/L		0.5	EPA 200.7	24-Oct-11 13:34	DJSULL1
DISSOLVED METALS BY ICP-MS							
Selenium (Se)	**684**	ug/L		10	EPA 200.8	19-Oct-11 12:10	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**142**	ug/L		10	EPA 200.8	19-Oct-11 12:28	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 12:28	KRICHAR
Chromium (Cr)	**193**	ug/L		10	EPA 200.8	19-Oct-11 12:28	KRICHAR
Copper (Cu)	**106**	ug/L		10	EPA 200.8	19-Oct-11 12:28	KRICHAR
Nickel (Ni)	**162**	ug/L		10	EPA 200.8	19-Oct-11 12:28	KRICHAR
Selenium (Se)	**5560**	ug/L		20	EPA 200.8	19-Oct-11 12:28	KRICHAR
Silver (Ag)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 12:28	KRICHAR
Zinc (Zn)	**173**	ug/L		20	EPA 200.8	19-Oct-11 12:28	KRICHAR

Certificate of Laboratory Analysis

Order # J11100223

Site: FGD Purge Eff — **Sample #: 2011022388**
Collection Date: 10-Oct-11 10:00 AM — Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		
TOTAL DISSOLVED SOLIDS							
TDS	**17000**	mg/L		200	SM2540C	14-Oct-11 16:05	TJA7067
TOTAL SUSPENDED SOLIDS							
TSS	**2000**	mg/L		250	SM2540D	14-Oct-11 10:40	TJA7067

Site: BIOREACTOR 1 INF. — **Sample #: 2011022389**
Collection Date: 10-Oct-11 10:00 AM — Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5)							
Vendor Parameter	**Complete**				V_PRISM		
Carbonate, Bicarbonate, and Hydroxide Alkalinity							
Carbonate (CO3)	**Complete**				V_PRISM		
Hydroxide (OH)	**Complete**				V_PRISM		
Bicarbonate (HCO3)	**Complete**				V_PRISM		
NITRITE + NITRATE (COLORIMETRIC)							
Nitrite + Nitrate (Colorimetric)	**14**	mg-N/L		0.25	EPA 353.2	18-Oct-11 13:02	BGN9034
INORGANIC IONS BY IC							
Bromide	**90**	mg/L		5	EPA 300.0	20-Oct-11 06:30	JAHERMA
Chloride	**6700**	mg/L		100	EPA 300.0	20-Oct-11 06:30	JAHERMA
Sulfate	**1300**	mg/L		100	EPA 300.0	20-Oct-11 06:30	JAHERMA
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		
MERCURY (COLD VAPOR) IN WATER							
Mercury (Hg)	**22.7**	ug/L		2.5	EPA 245.1	21-Oct-11 09:59	AGIBBS
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**154**	mg/L		0.5	EPA 200.7	24-Oct-11 13:38	DJSULL1
Calcium (Ca)	**3260**	mg/L		0.1	EPA 200.7	24-Oct-11 13:38	DJSULL1
Lithium (Li)	**< 0.05**	mg/L		0.05	EPA 200.7	24-Oct-11 13:38	DJSULL1
Magnesium (Mg)	**497**	mg/L		0.05	EPA 200.7	24-Oct-11 13:38	DJSULL1
Potassium (K)	**21.5**	mg/L		1	EPA 200.7	24-Oct-11 13:38	DJSULL1
Sodium (Na)	**38.8**	mg/L		0.5	EPA 200.7	24-Oct-11 13:38	DJSULL1

Certificate of Laboratory Analysis

Order # J11100223

Site: BIOREACTOR 1 INF. **Sample #: 2011022389**
Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Chromium (Cr)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Copper (Cu)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Nickel (Ni)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Selenium (Se)	**1300**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Silver (Ag)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:34	KRICHAR
Zinc (Zn)	**< 20**	ug/L		20	EPA 200.8	19-Oct-11 11:34	KRICHAR
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		

Site: BIOREACTOR 1 INF. BLANK **Sample #: 2011022390**
Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		

Site: BIOREACTOR 2 EFF. **Sample #: 2011022391**
Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5)							
Vendor Parameter	**Complete**				V_PRISM		
Carbonate, Bicarbonate, and Hydroxide Alkalinity							
Carbonate (CO3)	**Complete**				V_PRISM		
Hydroxide (OH)	**Complete**				V_PRISM		
Bicarbonate (HCO3)	**Complete**				V_PRISM		
NITRITE + NITRATE (COLORIMETRIC)							
Nitrite + Nitrate (Colorimetric)	**0.014**	mg-N/L		0.01	EPA 353.2	18-Oct-11 13:04	BGN9034
INORGANIC IONS BY IC							
Bromide	**89**	mg/L		5	EPA 300.0	20-Oct-11 06:46	JAHERMA
Chloride	**6500**	mg/L		100	EPA 300.0	20-Oct-11 06:46	JAHERMA
Sulfate	**1500**	mg/L		100	EPA 300.0	20-Oct-11 06:46	JAHERMA
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J11100223

Site: BIOREACTOR 2 EFF. **Sample #: 2011022391**

Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
MERCURY (COLD VAPOR) IN WATER							
Mercury (Hg)	**< 1**	ug/L		1	EPA 245.1	21-Oct-11 10:01	AGIBBS
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**151**	mg/L		0.5	EPA 200.7	24-Oct-11 12:40	DJSULL1
Calcium (Ca)	**3220**	mg/L		0.1	EPA 200.7	24-Oct-11 12:40	DJSULL1
Lithium (Li)	**0.053**	mg/L		0.05	EPA 200.7	24-Oct-11 12:40	DJSULL1
Magnesium (Mg)	**498**	mg/L		0.05	EPA 200.7	24-Oct-11 12:40	DJSULL1
Potassium (K)	**26.2**	mg/L		1	EPA 200.7	24-Oct-11 12:40	DJSULL1
Sodium (Na)	**38.8**	mg/L		0.5	EPA 200.7	24-Oct-11 12:40	DJSULL1
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**< 5**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Cadmium (Cd)	**< 5**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Chromium (Cr)	**< 5**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Copper (Cu)	**< 5**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Nickel (Ni)	**< 5**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Selenium (Se)	**11.9**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Silver (Ag)	**6.62**	ug/L		5	EPA 200.8	19-Oct-11 11:07	KRICHAR
Zinc (Zn)	**< 10**	ug/L		10	EPA 200.8	19-Oct-11 11:07	KRICHAR
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		

Site: BIOREACTOR 2 EFF. BLANK **Sample #: 2011022392**

Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		

Site: FILTER BLANK **Sample #: 2011022393**

Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
DISSOLVED METALS BY ICP-MS							
Selenium (Se)	**1.72**	ug/L		1	EPA 200.8	19-Oct-11 10:46	KRICHAR

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J11100223

Site: Trip Blank **Sample #: 2011022394**

Collection Date: 10-Oct-11 10:00 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**< 0.05**	mg/L		0.05	EPA 200.7	24-Oct-11 13:03	DJSULL1
Calcium (Ca)	**0.022**	mg/L	R1	0.01	EPA 200.7	24-Oct-11 13:03	DJSULL1
Lithium (Li)	**< 0.005**	mg/L		0.005	EPA 200.7	24-Oct-11 13:03	DJSULL1
Magnesium (Mg)	**< 0.005**	mg/L		0.005	EPA 200.7	24-Oct-11 13:03	DJSULL1
Potassium (K)	**< 0.1**	mg/L		0.1	EPA 200.7	24-Oct-11 13:03	DJSULL1
Sodium (Na)	**< 0.05**	mg/L		0.05	EPA 200.7	24-Oct-11 13:03	DJSULL1
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**< 1**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Cadmium (Cd)	**< 1**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Chromium (Cr)	**< 1**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Copper (Cu)	**1.87**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Nickel (Ni)	**< 1**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Selenium (Se)	**< 1**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Silver (Ag)	**< 1**	ug/L		1	EPA 200.8	19-Oct-11 10:55	KRICHAR
Zinc (Zn)	**< 2**	ug/L		2	EPA 200.8	19-Oct-11 10:55	KRICHAR
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		

Qualifiers:

R1 Relative Percent Difference exceeded method acceptance limits, see additional notes

Duke Energy Corporation (04)
Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11100223
Lab Submittal Date: 10/12/2011
Prism Work Order: 1100326

This data package contains the analytical results for the project identified above and includes a Case Narrative, Sample Results and Chain of Custody. Unless otherwise noted, all samples were received in acceptable condition and processed according to the referenced methods.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative.

Please call if you have any questions relating to this analytical report.

Respectfully,

PRISM LABORATORIES, INC.

VP Laboratory Services

Reviewed By

Data Qualifiers Key Reference:

HT	Sample received and analyzed outside of the hold time.
BRL	Below Reporting Limit
MDL	Method Detection Limit
RPD	Relative Percent Difference
*	Results reported to the reporting limit. All other results are reported to the MDL with values between MDL and reporting limit indicated with a J.

PRISM LABORATORIES, INC. Full-Service Analytical & Environmental Solutions

Sample Receipt Summary

10/15/2011

Prism Work Order: 1100326

Client Sample ID	Lab Sample ID	Matrix	Date Sampled	Date Received
2011022388/FGD Purge Eff	1100326-01	Water	10/10/11	10/12/11
2011022389/BioReactor 1 Inf	1100326-02	Water	10/10/11	10/12/11
2011022391/BioReactor 2 Eff	1100326-03	Water	10/10/11	10/12/11

Samples received in good condition at 1.8 degrees C unless otherwise noted.

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543
Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11100223
Sample Matrix: Water

Client Sample ID: 2011022388/FGD Purge Eff
Prism Sample ID: 1100326-01
Prism Work Order: 1100326
Time Collected: 10/10/11 10:00
Time Submitted: 10/12/11 16:50

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	**7.0 HT**	**pH Units**			**1**	***SM4500-H B**	**10/13/11 14:00**	**JAB**	**P1J0246**
Total Alkalinity	**48**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**10/13/11 11:00**	**JAB**	**P1J0243**
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	10/13/11 11:00	JAB	P1J0244
Bicarbonate Alkalinity	**48**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**10/13/11 11:00**	**JAB**	**P1J0245**

Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11100223
Sample Matrix: Water

Client Sample ID: 2011022389/BioReactor 1 Inf
Prism Sample ID: 1100326-02
Prism Work Order: 1100326
Time Collected: 10/10/11 10:00
Time Submitted: 10/12/11 16:50

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	**7.6 HT**	**pH Units**			**1**	***SM4500-H B**	**10/13/11 14:00**	**JAB**	**P1J0246**
Total Alkalinity	**79**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**10/13/11 11:00**	**JAB**	**P1J0243**
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	10/13/11 11:00	JAB	P1J0244
Bicarbonate Alkalinity	**79**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**10/13/11 11:00**	**JAB**	**P1J0245**

Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11100223
Sample Matrix: Water

Client Sample ID: 2011022391/BioReactor 2 Eff
Prism Sample ID: 1100326-03
Prism Work Order: 1100326
Time Collected: 10/10/11 10:00
Time Submitted: 10/12/11 16:50

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	**7.3 HT**	**pH Units**			**1**	***SM4500-H B**	**10/13/11 14:00**	**JAB**	**P1J0246**
Total Alkalinity	**130**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**10/13/11 11:00**	**JAB**	**P1J0243**
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	10/13/11 11:00	JAB	P1J0244
Bicarbonate Alkalinity	**130**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**10/13/11 11:00**	**JAB**	**P1J0245**

Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No: J11100223

Prism Work Order: 1100326
Time Submitted: 10/12/2011 4:50:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P1J0243 - NO PREP										
Blank (P1J0243-BLK1)				Prepared & Analyzed: 10/13/11						
Total Alkalinity	BRL	5.0	mg/L							
LCS (P1J0243-BS1)				Prepared & Analyzed: 10/13/11						
Total Alkalinity	254	5.0	mg/L	250.0		101	90-110			
LCS Dup (P1J0243-BSD1)				Prepared & Analyzed: 10/13/11						
Total Alkalinity	254	5.0	mg/L	250.0		101	90-110	0.004	200	
Batch P1J0244 - NO PREP										
Blank (P1J0244-BLK1)				Prepared & Analyzed: 10/13/11						
Carbonate Alkalinity	BRL	5.0	mg/L							
LCS (P1J0244-BS1)				Prepared & Analyzed: 10/13/11						
Carbonate Alkalinity	254	5.0	mg/L				90-110			
LCS Dup (P1J0244-BSD1)				Prepared & Analyzed: 10/13/11						
Carbonate Alkalinity	254	5.0	mg/L				90-110	0	200	
Batch P1J0245 - NO PREP										
Blank (P1J0245-BLK1)				Prepared & Analyzed: 10/13/11						
Bicarbonate Alkalinity	BRL	5.0	mg/L							
LCS (P1J0245-BS1)				Prepared & Analyzed: 10/13/11						
Bicarbonate Alkalinity	254	5.0	mg/L	250.0		101	90-110			

Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No: J11100223

Prism Work Order: 1100326
Time Submitted: 10/12/2011 4:50:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P1J0245 - NO PREP										
LCS Dup (P1J0245-BSD1)				Prepared & Analyzed: 10/13/11						
Bicarbonate Alkalinity	254	5.0	mg/L	250.0		101	90-110	0	200	
Batch P1J0246 - NO PREP										
LCS (P1J0246-BS1)				Prepared & Analyzed: 10/13/11						
pH	6.86		pH Units	6.860		100	99-101			

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only
LIMS #: J11100223 | Matrix: OTHER | Samples Originating From: NC ✓ SC
Logged By: Am | Date & Time: 10-12-11 9:04 | SAMPLE PROGRAM: Ground Water NPDES Drinking Water UST RCRA Waste
Cooler Temp (C): L.1

[19]Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Customer must Complete Analytical Laboratory Page 6 of 9

[1]Project Name: HAPS/MACT Testing Belews Creek		2)Phone No:
3)Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson		4)Fax No:
5)Business Unit:	6)Process:	Mail Code:
8)Oper. Unit:	9)Res. Type:	10)Resp. Center:

AS&C PO#133241
[redacted]
PRISM PO#144725
[redacted]
Brooks Rand PO#141391

Complete all shaded areas.

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS (4)	Hg - 245.1 (3)	Hg Dissolved, 245.1 (3)	Metals* (3)	Se, soluble (3)	Se, Speciation, V_ASC (4)	Hg 1631, V_BRand (None)	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism (4)	Chloride, Sulfate, Bromide - Dionex (4)	Nitrate-nitrite, C_NO3/NO2 (2,4)	
201122388		FGD Purge Eff	10/10/11	10:00	Dean Matheson			1	1	1	1	1	1		1	1	1	ϕ1
89																		
90		BioReactor 1 Inf	10/10/11	10:00	Dean Matheson				1		1		1	1	1	1	1	ϕ2
91		BioReactor 1 Inf Hg Blk	9-28-11	1300	Am									1				
92		BioReactor 2 Eff	10/10/11	10:00	Dean Matheson				1		1		1	1	1	1	1	ϕ3
		BioReactor 2 Eff Hg Blk	9-28-11	1300	Am									1				
93		Filter Blk	9-28-11	1300	Am							1						
94		Metals Trip Blk	10/10/11	10:00	Dean Matheson						1		1					

Customer to complete appropriate columns to right

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Dean Matheson	Date/Time: 10/10/11 10:00	2) Accepted By:	Date/Time:
3) Relinquished By:	Date/Time: 10-12-11 8:30	4) Accepted By:	Date/Time: 10-12-11 9:30
5) Relinquished By:	Date/Time: 10-12-11 1535	6) Accepted By:	Date/Time: 10-12-11 1535
7) Relinquished By:	Date/Time: 10-13-11 1300	8) Accepted By:	Date/Time:
9) Seal/Locked By: Relinquished by Dean Mat	Date/Time: 10-12-11 1650	10) Seal/Lock Opened By: REC'D BY:	Date/Time: 10/12/11 1650
11) Seal/Locked By:	Date/Time: 10-13-11	12) Seal/Lock Opened By:	Date/Time:

Comments: * Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround
14 Days _____
*7 Days _____
*48 Hr _____
*Other _____
Add. Cost Will Apply

(P) 10-19-11
(QSC) 10-20-11
(Brand)

1104326

1, 8 TBL

October 26, 2011

Duke Energy
ATTN: Jay Perkins
Scientific Support-Laboratory
13339 Hagers Ferry Road
Huntersville NC 28078
jcperkins@duke-energy.com
labcustomer@duke-energy.com

RE: Project DUK-HV1101 Client Project: J11100223

Dear Mr. Perkins,

On October 14, 2011, Brooks Rand Labs (BRL) received two (2) flue gas desulfurization (FGD) wastewater samples and two (2) corresponding blank samples. Samples were logged-in for total mercury (Hg) analysis. All samples were received, prepared, analyzed, and stored according to BRL SOPs and EPA methodology.

The results were blank-corrected as described in the calculations section of the applicable SOP(s) and may be evaluated using adjusted reporting limits to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific detection limits and other details.

BRL, an accredited laboratory, certifies the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, see the *Report Information* page of the report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

Tiffany Stilwater
Project Manager
tiffany@brooksran.com

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Report Information

Laboratory Accreditation

BRL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BRL is also certified by many other states to perform environmental analyses. For a current list of our accreditations /certifications, please visit our website at <http://www.brooksrand.com/default.asp?contentID=586>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

BLK	method blank	**MS**	matrix spike
BRL	Brooks Rand Labs	**MSD**	matrix spike duplicate
BS	laboratory fortified blank	**ND**	non-detect
CAL	calibration standard	**NR**	non-reportable
CCV	continuing calibration verification	**PS**	post preparation spike
COC	chain of custody record	**REC**	percent recovery
CRM	certified reference material	**RPD**	relative percent difference
D	dissolved fraction	**RSD**	relative standard deviation
DUP	duplicate	**SCV**	secondary calibration verification
ICV	initial calibration verification	**SOP**	standard operating procedure
MDL	method detection limit	**SRM**	standard reference material
MRL	method reporting limit	**T**	total recoverable fraction

Definition of Data Qualifiers

(Effective 9/23/09)

B Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
E An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H Holding time and/or preservation requirements not met. Result is estimated.
J Estimated value. A full explanation is presented in the narrative.
J-M Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.
J-N Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.
M Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.
N Spike recovery was not within acceptance criteria. Result is estimated.
R Rejected, unusable value. A full explanation is presented in the narrative.
U Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Rand, Ltd., those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses; USEPA; July 2002. These supersede all previous qualifiers ever employed by BRL.

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
BioReactor 1 Inf	1142046-01	Influent	Sample	10/10/2011	10/14/2011
BioReactor 1 Inf Hg Blk	1142046-02	DIW	Field Blank	09/28/2011	10/14/2011
BioReactor 2 Eff	1142046-03	Effluent	Sample	10/10/2011	10/14/2011
BioReactor 2 Eff Hg Blk	1142046-04	DIW	Field Blank	09/28/2011	10/14/2011

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
Hg	Water	EPA 1631	10/21/2011	10/25/2011	B111723	1100738

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
BioReactor 1 Inf										
1142046-01	Hg	Influent	T	25500		76.5	204	ng/L	B111723	1100738
BioReactor 1 Inf Hg Blk										
1142046-02	Hg	DIW	T	0.15	U	0.15	0.41	ng/L	B111723	1100738
BioReactor 2 Eff										
1142046-03	Hg	Effluent	T	501		3.03	8.08	ng/L	B111723	1100738
BioReactor 2 Eff Hg Blk										
1142046-04	Hg	DIW	T	0.15	U	0.15	0.41	ng/L	B111723	1100738

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Accuracy & Precision Summary

Batch: B111723
Lab Matrix: Water
Method: EPA 1631

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B111723-SRM1	**Certified Reference Material (1140052, THg ICV 1641d)**						
	Hg		15.68	14.44	ng/L	92% 85-115	
B111723-MS2	**Matrix Spike (1143014-01)**						
	Hg	436.0	2020	2506	ng/L	102% 71-125	
B111723-MSD2	**Matrix Spike Duplicate (1143014-01)**						
	Hg	436.0	2020	2473	ng/L	101% 71-125	1% 24

Method Blanks & Reporting Limits

Batch: B111723
Matrix: Water
Method: EPA 1631
Analyte: Hg

Sample	Result	Units
B111723-BLK1	0.04	ng/L
B111723-BLK2	0.0008	ng/L
B111723-BLK3	0.05	ng/L
B111723-BLK4	0.02	ng/L

Average: 0.03 **Standard Deviation:** 0.02 **MDL:** 0.15
Limit: 0.50 **Limit:** 0.10 **MRL:** 0.41

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Instrument Calibration

Sequence: 1100738
Instrument: THG-05
Date: 10/25/2011
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1100738-IBL1		8.42	pg of Hg		
1100738-IBL2		8.90	pg of Hg		
1100738-IBL3		7.23	pg of Hg		
1100738-IBL4		8.50	pg of Hg		
1100738-CAL1	25.00	24.03	pg of Hg	96%	
1100738-CAL2	100.0	99.48	pg of Hg	99%	
1100738-CAL3	500.0	511.0	pg of Hg	102%	
1100738-CAL4	2500	2549	pg of Hg	102%	
1100738-CAL5	10000	10050	pg of Hg	100%	
1100738-ICV1	1568	1444	pg of Hg	92%	85-115
1100738-CCB1		12.1	pg of Hg		
1100738-CCV1	500.0	514.6	pg of Hg	103%	77-123
1100738-CCB2		8.55	pg of Hg		
1100738-CCV2	500.0	497.9	pg of Hg	100%	77-123
1100738-CCB3		37.1	pg of Hg		
1100738-CCV3	500.0	512.1	pg of Hg	102%	77-123

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Containers

Lab ID: 1142046-01
Sample: BioReactor 1 Inf
Report Matrix: Influent
Sample Type: Sample
Collected: 10/10/2011
Received: 10/14/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler

Lab ID: 1142046-02
Sample: BioReactor 1 Inf Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 09/28/2011
Received: 10/14/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler

Lab ID: 1142046-03
Sample: BioReactor 2 Eff
Report Matrix: Effluent
Sample Type: Sample
Collected: 10/10/2011
Received: 10/14/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler

Lab ID: 1142046-04
Sample: BioReactor 2 Eff Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 09/28/2011
Received: 10/14/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler

Shipping Containers

Cooler

Received: October 14, 2011 9:00
Tracking No: 472679664810 via FedEx
Coolant Type: Ice
Temperature: 3.6 °C

Description: Cooler
Damaged in transit? No
Returned to client? No

Custody seals present? No
Custody seals intact? No
COC present? Yes

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

4

Duke Energy

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J11100223 | Matrix: OTHER | Samples Originating From | NC ✓ SC

Logged By: Am | Date & Time: 10-12-11 9:04 | SAMPLE PROGRAM: Ground Water NPDES / Drinking Water / UST / RCRA / Waste

Cooler Temp (C): 1.1

[19]Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

1112046

Customer must Complete | Analytical Laboratory Page 23 of 32

1)Project Name: HAPS/MACT Testing Belews Creek		2)Phone No:
2)Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson		4)Fax No:
5)Business Unit:	6)Process:	Mail Code:
8)Oper. Unit:	9)Res. Type:	10)Resp. Center:

AS&C
PO#133241
[redacted]
PRISM
PO#144725
[redacted]
Brooks Rand
PO#141391

Complete all shaded areas.

[15]Preserv.:1=HCl 2=H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS	Hg - 245.1	Hg Dissolved, 245.1	Metals*	Se, soluble	Se, Speciation, V_ASC	Hg 1631, V_BRand	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C_NO3/NO2
								4	3	3	3	3	4	None	4	4	2,4
2011022388		FGD Purge Eff	10/10/11	10:00	Dean Matheson			1	1	1	1	1	1		1	1	1
89																	
90		BioReactor 1 Inf	10/10/11	10:00	Dean Matheson				1		1		1	1	1	1	1
91		BioReactor 1 Inf Hg Blk	9-28-11	1300	Am									1			
92		BioReactor 2 Eff	10/10/11	10:00	Dean Matheson				1		1		1	1	1	1	1
		BioReactor 2 Eff Hg Blk	9-28-11	1300	Am									1			
93		Filter Blk	9-28-11	1300	Am							1					
94		Metals Trip Blk	10/10/11	10:00	Dean Matheson						1		1				

Customer to complete appropriate columns to right.

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Dean Matheson	Date/Time: 10/10/11 10:00	2) Accepted By:	Date/Time:
3) Relinquished By: Am	Date/Time: 10-12-11 8:30	4) Accepted By:	Date/Time: 10-12-11 8:30
5) Relinquished By:	Date/Time:	6) Accepted By:	Date/Time: 10/14/11 900
7) Relinquished By:	Date/Time: 10-13-11 1300	8) Accepted By:	Date/Time:
9) Seal/Locked By:	Date/Time:	10) Seal/Lock Opened By:	Date/Time:
11) Seal/Locked By:	Date/Time: 10-13-11	12) Seal/Lock Opened By:	Date/Time:

Comments

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround

14 Days _____
*7 Days _____
*48 Hr _____
*Other _____
Add. Cost Will Apply

(P) 10-19-11
(ASC) 10-20-11
Brand 10-20-11

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

October 21, 2011

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078
(704) 875-5245

Project: HAPS/MACT Testing Belews Creek (LIMS # J11100223)

Dear Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for selenium speciation analysis on October 13, 2011. The samples were received on October 14, 2011 in a sealed cooler at 0.7°C. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek (LIMS # J11100223)

October 21, 2011

1. Sample Reception

Four (4) aqueous samples in 125mL HDPE bottles (provided by Applied Speciation and Consulting) were submitted for selenium speciation analysis on October 13, 2011. The samples were received on October 14, 2011 in a sealed container at 0.7°C.

The samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Upon reception, the samples were designated discrete sample identifiers. An aliquot of each sample was filtered (0.45µm) and these filtrates were stored in a secure, monitored cryofreezer (maintained at a temperature of -80^{o}C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS).

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Selenium Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of the samples may shift the equilibrium of the system resulting in changes in speciation ratios.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of

each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Selenium Speciation Analysis by IC-ICP-DRC-MS All samples for selenium speciation analysis were analyzed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS) on October 17-18, 2011. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic (pH > 7) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a specific reactive gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits with the following exceptions:

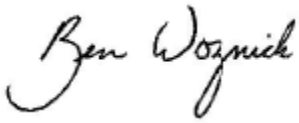
The recoveries associated with the matrix spike (MS) and matrix spike duplicate (MSD) performed on the sample identified as Batch QC were below the established control limit of 75% for selenocyanate (54.4% and 51.2%, respectively). The MS and MSD also included selenite in the spiking solution which yielded elevated recoveries (139.1% and 143.3%, respectively). The low recoveries for selenocyanate correlate with the elevated recoveries of selenite suggesting that the sample matrix induces species conversion. The fact that no species conversion was observed in the ICV or CCVs, which contain both selenite and selenocyanate, demonstrates that the applied method stabilizes these selenium species in solution. Since the conversion of selenocyanate to selenite in the MS and MSD is a function of the sample matrix and the recoveries confirm a mass balance, no corrective action was required. The reported results are deemed representative of the supplied samples and suggest that selenocyanate is not stable in the spiked sample matrix.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,



Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Selenium Speciation Results for Duke Energy
Project Name: HAPS/MACT Testing Belews Creek
Contact: Jay Perkins
LIMS #J11100223

Date: October 21, 2011
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	Se(IV)	Se(VI)	SeCN	MeSe(IV)	SeMe	Unknown Se Species (n)
FGD Purge Eff	12.5	1590	ND (<1.3)	ND (<1.5)	ND (<1.5)	0 (0)
BioReactor 1 Inf	18.1	1130	ND (<0.34)	ND (<0.37)	ND (<0.37)	0 (0)
BioReactor 2 Eff	2.10	6.43	ND (<0.34)	ND (<0.37)	ND (<0.37)	0 (0)
Metals Trip Blk	ND (<0.097)	ND (<0.055)	ND (<0.067)	ND (<0.073)	ND (<0.073)	0 (0)

All results reflect the applied dilution and are reported in µg/L
ND = Not detected at the applied dilution
SeCN = Selenocyanate
MeSe(IV) = Methylseleninic acid
SeMe = Selenomethionine
Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS
n = number of unknown Se species observed

Selenium Speciation Results for Duke Energy
Project Name: HAPS/MACT Testing Belews Creek
Contact: Jay Perkins
LIMS #J11100223

Date: October 21, 2011
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 10x	eMDL 50x	eMDL 200x
Se(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.097	0.48	1.9
Se(VI)	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.055	0.28	1.1
SeCN	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.067	0.34	1.3
MeSe(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.073	0.37	1.5
SeMe	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.073	0.37	1.5

eMDL = Estimated Method Detection Limit
*Please see narrative regarding eMDL calculations

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
Se(IV)	LCS	9.57	11.24	117.5
Se(VI)	LCS	9.48	10.01	105.6
SeCN	LCS	8.92	9.239	103.6
MeSe(IV)	LCS	6.47	5.847	90.4
SeMe	LCS	9.32	9.200	98.7

Selenium Speciation Results for Duke Energy
Project Name: HAPS/MACT Testing Belews Creek
Contact: Jay Perkins
LIMS #J11100223

Date: October 21, 2011
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Se(IV)	Batch QC*	12.0	11.9	11.9	0.8
Se(VI)	Batch QC*	973.3	1020	996.7	4.7
SeCN	Batch QC*	ND (<1.3)	ND (<1.3)	NC	NC
MeSe(IV)	Batch QC*	ND (<1.5)	ND (<1.5)	NC	NC
SeMe	Batch QC*	ND (<1.5)	ND (<1.5)	NC	NC

ND = Not detected at the applied dilution
NC = Value was not calculated due to one or more concentrations below the eMDL
* Batch QC performed on sample from LIMS # J11100235

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Se(IV)	Batch QC*	1112	1559	139.1**	1112	1606	143.3**	3.0
Se(VI)	Batch QC*	1009	2025	101.9	1009	2077	107.1	2.6
SeCN	Batch QC*	915.0	497.9	54.4**	915.0	468.2	51.2**	6.1

* Batch QC performed on sample from LIMS # J11100235
** The recovery is outside the established control limits of 75-125%; please see narrative

4

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J11/00223 | Matrix: OTHER | Samples Originating From NC ✓ SC ___

Logged By: Am | Date & Time: 10-12-11 9:04

Cooler Temp (C): 1.1.0

SAMPLE PROGRAM: Ground Water ___ NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___

[19]Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Customer must Complete

1)Project Name	HAPS/MACT Testing Belews Creek	2)Phone No:
2) Client:	Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson	4)Fax No:
5)Business Unit:	6)Process:	Mail Code:
8)Oper. Unit:	9)Res. Type:	10)Resp. Center:

AS&C
PO#133241
[redacted]
PRISM
PO#144725
[redacted]
Brooks Rand
PO#141391

Complete all shaded areas.

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS	Hg - 245.1	Hg Dissolved, 245.1	Metals*	Se, soluble	Se, Speciation, V_ASC	Hg 1631, V_BRand	Carbonate alkalinity, bicarbonate alkalinity, total (4.5), pH - V_Prism	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C_NO3/NO2
								4	3	3	3	3	4	None	4	4	2,4
2011022388		FGD Purge Eff	10/10/11	10:00	Dean Mathison			1	1	1	1	1	1		1	1	1
89																	
90		BioReactor 1 Inf	10/10/11	10:00	Dean Mathison				1		1		1	1	1	1	1
91		BioReactor 1 Inf Hg Blk	9-28-11	1300	Am									1			
92		BioReactor 2 Eff	10/10/11	10:00	Dean Mathison				1		1		1	1	1	1	1
		BioReactor 2 Eff Hg Blk	9-28-11	1300	Am									1			
93		Filter Blk	9-28-11	1300	Am							1					
94		Metals Trip Blk	10/10/11	10:00	Dean Mathison						1		1				

Customer to complete appropriate columns to right.

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Dean Mathison	Date/Time: 10/10/11 10:00	2) Accepted By:	Date/Time:
3) Relinquished By: Am	Date/Time: 10-12-11 8:30	4) Accepted By: A Moore	Date/Time: 10-12-11 830
5)Relinquished By:	Date/Time:	6)Accepted By:	Date/Time:
7)Relinquished By: A Moore	Date/Time: 10-13-11 1300	8)Accepted By:	Date/Time:
9)Seal/Locked By:	Date/Time:	10) Seal/Lock Opened By: Tyler Lee	Date/Time: 10/14/11 1500 T:0.7
11)Seal/Locked By: A Moore	Date/Time: 10-13-11	12)Seal/Lock Opened By: Tyler Lee	Date/Time: 10/14/11 1500

Comments

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround

14 Days ___
*7 Days ___
*48 Hr ___
*Other ___
Add Cost Will Apply

(P) 10-19-11
(ASC) ~~10-20-11~~

4

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J11/00223 | Matrix: OTHER | Samples Originating From | NC ✓ SC
Logged By: am | Date & Time: 10-12-11 9:04 | Cooler Temp (C): 4.0
SAMPLE PROGRAM: Ground Water | NPDES | Drinking Water | UST | RCRA | Waste

[19]Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

AS&C PO#133241
PRISM PO#144725
Brooks Rand PO#141391

Customer must Complete

1)Project Name: HAPS/MACT Testing Belews Creek		2)Phone No:
2) Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson		4)Fax No:
5)Business Unit:	6)Process:	Mail Code:
8)Oper. Unit:	9)Res. Type:	10)Resp. Center:

Complete all shaded areas.

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

[11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS (4)	Hg - 245.1 (3)	Hg Dissolved, 245.1 (3)	Metals* (3)	Se, soluble (3)	Se, Speciation, V_ASC (4)	Hg 1631, V_BRand (None)	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism (4)	Chloride, Sulfate, Bromide - Dionex (4)	Nitrate-nitrite, C_NO3/NO2 (2,4)
20//022388		FGD Purge Eff	10/10/11	10:00	Dean Mathson			1	1	1	1	1	1		1	1	1
89		BioReactor 1 Inf	10/10/11	10:00	Dean Mathson				1		1		1	1	1	1	1
90		BioReactor 1 Inf Hg Blk	9-28-11	1300	am									1			
91		BioReactor 2 Eff	10/10/11	10:00	Dean Mathson				1		1		1	1	1	1	1
92		BioReactor 2 Eff Hg Blk	9-28-11	1300	am									1			
93		Filter Blk	9-28-11	1300	am							1					
94		Metals Trip Blk	10/10/11	10:00	Dean Mathson						1		1				

LAB USE ONLY

Customer to complete appropriate columns to right

Customer to sign & date below - fill out from left to right.

1) Relinquished By: Dean Mathson	Date/Time: 10/10/11 10:00	2) Accepted By:	Date/Time:
3) Relinquished By: am	Date/Time: 10-12-11 8:30	4) Accepted By:	Date/Time: 10-12-11 8:30
5)Relinquished By: Cindy Knox	Date/Time: 10-12-11 1535	6)Accepted By:	Date/Time: 10-12-11 1535
7)Relinquished By:	Date/Time: 10-13-11 1300	8)Accepted By:	Date/Time:
9)Seal/Locked By:	Date/Time:	10) Seal/Lock Opened By:	Date/Time:
11)Seal/Locked By:	Date/Time: 10-13-11	12)Seal/Lock Opened By:	Date/Time:

Comments: * Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround
14 Days ____
*7 Days ____
*48 Hr ____
*Other ____
Add. Cost Will Apply

(P) 10-19-11
(ASC) 10-20-11
(Brand)